

## **Memorandum**

TO: Ravalli County Planning Department

FROM: Land Use Clinic, University of Montana School of Law

DATE: March 23, 2007

RE: Highway 93 South Corridor Plan  
Proposed Commercial Lighting Ordinance/Considerations

### **OVERVIEW**

Good outdoor lighting at night benefits everyone. It increases safety, enhances night time character, and helps provide security. New lighting technologies have produced lights that are extremely powerful, and many of these types of lights may be improperly installed so that they create problems of excessive glare, light trespass and higher energy use. There is a need for a lighting ordinance that recognizes the benefits of outdoor lighting and provides clear guidelines for its installation so as to help maintain and compliment the character of the corridor. Appropriately regulated, and installed, outdoor lighting will contribute to the safety and welfare of the residents of Ravalli County. A Commercial Lighting Ordinance should be implemented as part of the Highway 93 corridor planning and development regulation.

Certain issues were identified during the Ravalli County Public Meetings on Land Use in the Highway 93 South Corridor, in 2006. Among those issues identified was light pollution. One of the overarching goals identified in the study was the preservation of the rural character of the community. Additionally, light pollution is expressly addressed in the Ravalli County Growth Policy at Countywide Goal 7 and Countywide Policy 7.5. If commercial lighting is allowed to proceed unchecked, the rural character will be considerably compromised. Of course, as with all planning, a balance must be struck between strict aesthetics and the public safety.

Today there are estimated to be more than 1,000 communities in the U.S.A. with outdoor lighting control ordinances. An outdoor lighting control ordinance places restrictions on the lighting type, when it can be used, and other matters affecting its quality and value.

### **DISCUSSION**

#### **General**

The Highway 93 South Corridor is facing the strong probability of development and that development has potential to drastically affect the night sky which to this point has largely been unimpeded. With development pending, negative effects are certain to occur. The major components of light pollution as identified by the International Dark-

Sky Association (IDA) are glare, light trespass, visual clutter and confusion, artificial sky glow and energy waste.

**Glare:** Intense and blinding light that causes discomfort and a reduction in one's ability to see resulting in an annoyance and possible safety problems. Glare never adds value, but it is common to all locales. Unfortunately, too often people mistake the absence of glare for the lack of light. Glare is neither wanted nor needed for any nighttime activity.

**Light trespass:** Light falling where it is not wanted or needed. Light trespass is intrusive lighting and reduces everyone's privacy. Spill light (also known as stray light) is light falling outside the intended area, and it can result in light trespass. Light coming into a yard or bedroom window at night from streetlights, the nearby car dealer or mall, or from a neighbors security light is light trespass. This type of light pollution usually has glare and always wastes both light and energy.

**Visual clutter and confusion:** Light "noise" in the field of view that is both distracting and annoying. Some examples include too many brightly lit signs or too many bright lights. Visual clutter and confusion may make it difficult to see or differentiate between directional signs and traffic signals.

**Artificial sky glow:** The artificial brightening of the night sky due to inefficient lighting fixtures that shine light upward, it is essentially wasted light. The night view of previous generations has virtually disappeared for many locales today. Population growth in Ravalli County may threaten this fate on a wide scale.

**Energy waste:** Light that is not serving a "useful" purpose or light that is produced by inefficient sources is a cause of energy waste.

The knee-jerk reaction to safety concerns is usually to provide more light, but too much lighting and glare compromise the eye's nighttime adaptation level, and thus can easily compromise safety. The keys to good nighttime lighting are simple: 1) shine the light only where you need it, 2) use only the amount you need to see well, 3) turn the lights off when they aren't needed.

### **Authority**

In accordance with Montana Code Annotated § 76-2-203(1)(a) (2005), zoning regulations must be made in accordance with the growth policy or master plan. The issue of light pollution is expressly addressed in the Ravalli County Growth Policy. Countywide Goal 7: Plan for residential and commercial development. Countywide Policy 7.5: Encourage the use of light fixtures, which minimize light pollution in new development.

### **Application**

A commercial lighting ordinance should consider that good outdoor lighting at night is a benefit to everyone. It should: 1) Provide for and control lighting in outdoor public places where public health, safety and welfare are potential concerns; 2) Protect

drivers and pedestrians from the disabling glare of non-vehicular light sources; 3) Protect neighbors and the night sky from nuisance glare and light trespass from improperly selected or poorly aimed, placed, applied, maintained or shielded light sources; 4) Promote energy efficient lighting design and operation; and 5) Protect and retain the intended character and the natural environment, including the beauty and quality of the night sky in Ravalli County Highway 93 South Corridor.

While the concept of nighttime lighting would seem to be intuitive and straightforward, it is in fact a fairly complex science. Considerations need to be made as to location of fixtures, height of fixtures, and fixture design. Some industry standards for design are set forth by the Illuminating Engineering Society of North America (IESNA). For the most part, light should be restricted to illumination at or below the horizontal plane, with almost no provision for allowing upward illumination. Other considerations include the amount of time a certain level of light may shine, whether or not it must be dimmed after business hours, whether the use of landscape as a light buffer is permissible, the permissible brightness of parking lots and service stations as well as what restrictions may be placed upon façade lighting. For illustrative purposes the following sample language is provided.

### **SAMPLE REGULATORY LANGUAGE**

The following provisions apply only to developments in areas zoned for commercial uses.

#### **SECTION 1 - DEFINITIONS**

Unless specifically defined below, words or phrases used in this Ordinance shall be interpreted so as to give them the meaning they have in common usage and to give this Section its most reasonable application.

“Area Light” means light that produces over 1800 lumens. Area lights include, but are not limited to, street lights, parking lot lights and yard lights.

“Average Footcandle” means the level of light measured at an average point of illumination between the brightest and darkest areas. The measurement can be made on a horizontal plane at a level not to exceed five feet above the ground.

“Bulb” means the source of electric light. This is to be distinguished from the whole assembly (See Luminaire).

“Candela (cd)” means a unit of luminous intensity.

“Eighty-five (85) Degree Full Cut-Off Type Fixtures” means fixtures that do not allow light to escape above an 85 degree angle measured from a vertical line from the center of the lamp extended to the ground as defined by the IESNA.

“Exterior Lighting” means temporary or permanent lighting that is installed, located or used in such a manner to cause light rays to shine outside. Fixtures that are installed indoors that are intended to light something outside are considered exterior lighting.

“Fixture” means the assembly that holds the lamp in a lighting system. It includes the elements designed to give light output control, such as a reflector (mirror) or refractor (lens), the ballast, housing, and the attachment parts.

“Flood Light” means a lamp that produces up to 1800 lumens and is designed to "flood" a well-defined area with light. Generally, flood lights produce from 1000 to 1800 lumens.

“Flux (Radiant Flux)” means a unit of measurement in erg/sec or watts.

“Footcandle” means illuminance produced on a surface one foot from a uniform point source of one candela. Measured by a light meter.

“Full Cut-Off Fixtures” means fixtures, as installed, that are designed or shielded in such a manner that all light rays emitted by the fixture, either directly from the lamp or indirectly from the fixture, are projected below a horizontal plane running through the lowest point on the fixture where light is emitted as defined by the IESNA.

“Glare” means intense light that results in discomfort and/or a reduction of visual performance and visibility.

“IESNA” means the Illuminating Engineering Society of North America (IESNA), the professional society of lighting engineers, including those from manufacturing companies, and others professionally involved in lighting.

“Illuminance” means the density of luminous flux incident on a surface. The unit of measurement is footcandle or lux.

“Lamp” means the source of electric light: the bulb and its housing. This is to be distinguished from the whole assembly (See Luminaire).

“Light” means the form of radiant energy acting on the retina of the eye to make sight possible; it is brightness or illumination and distinguished from a fixture, as defined above.

“Light Pollution” means any adverse effect of manmade light including, but not limited to, light trespass, uplighting, uncomfortable distraction to the eye, or any manmade light that diminishes the ability to view the night sky.

“Light Trespass” means light falling where it is not wanted or needed, generally caused by a luminaire on a property that shines onto an adjacent property.

“Lighting” means any or all parts of a luminaire that function to produce light.

“Lumen” means the light output of a lamp with a uniform luminous intensity of one candela. One footcandle is one lumen per square foot. One lux is one lumen per square meter.

“Luminaire” means the complete lighting unit, including the lamp, the fixture, and other parts.

“Non-Essential Lighting” means lighting that is not necessary for an intended purpose after the purpose has been served.

“Partially Shielded” means that the bulb of the fixture is shielded by a translucent siding and the bulb is not visible at all. Light may be emitted at the horizontal level of the bulb.

“Recessed” means that a fixture is built into a structure or portion of a structure such that the fixture is fully cut-off and no part of the lamp extends or protrudes beyond the underside or any portion of the structure.

“Shielded” means the light emitted from the fixture is projected below a horizontal plane running through the lowest point of the fixture where light is emitted. The bulb is not visible with a shielded light fixture, and no light is emitted from the sides of the fixture. Also considered a full cut-off fixture.

“Uplighting” means lighting that is directed in such a manner as to shine light rays above the horizontal plane.

## SECTION 2 - CRITERIA

2.1 All applications for Design Review, Conditional Use, Subdivision and/or Building Permits shall include lighting plans showing location, type, height, and lumen output of all proposed and existing fixtures. The applicant shall provide enough information to verify that lighting conforms to the provisions of this Ordinance. The Planning and Zoning Administrator, Commission and/or Building Official shall have the authority to request additional information in order to achieve the purposes of this Ordinance.

2.2 All exterior lighting shall be full cut-off fixtures with the light source fully shielded, with the following exceptions:

- a. Luminaires that have a maximum output of 260 lumens per fixture, regardless of number of bulbs, (equal to one 20 watt incandescent light), may be left unshielded provided the fixture has an opaque top to keep light from shining directly up.
- b. Luminaires that have a maximum output of 1,000 lumens per fixture, regardless of number of bulbs, (equal to one 60 watt incandescent light) may be partially

shielded, provided the bulb is not visible, and the fixture has an opaque top to keep light from shining directly up.

c. Flood lights with external shielding may be angled provided that no light escapes above a 25 degree angle measured from the vertical line from the center of the light extended to the ground, and only if the light does not cause glare or light to shine on adjacent property or public rights-of-way. Flood lights with directional shielding are encouraged. Photocells with timers that allow a floodlight to go on at dusk and off by 11:00 p.m. are encouraged.

d. Sensor activated lighting may be unshielded provided it is located in such a manner as to prevent direct glare and lighting into properties of others or into a public right-of-way, and provided the light is set to only go on when activated and to go off within five minutes after activation has ceased, and the light shall not be triggered by activity off the property.

e. Vehicular lights and all temporary emergency lighting needed by the Fire and Police Departments, or other emergency services shall be exempt from the requirements of this Ordinance.

2.3 Light Trespass - It is the intent of this Ordinance to eliminate and prevent light trespass through the proper installation of lighting fixtures. All existing and/or new exterior lighting shall not cause light trespass and shall be such as to protect adjacent properties from glare and excessive lighting. Landscaping may not be used as buffer to light trespass.

2.4 IESNA Guidelines - The Commission may require that any new lighting or existing lighting that comes before them meet the standards for footcandle output as established by IESNA.

2.5 All non-essential exterior commercial lighting is to be turned off after business hours and/or when not in use. Lights with a timer installed are encouraged. Sensor activated lights are encouraged to replace existing lighting that is desired for security purposes.

2.6 Area Lights - All area lights, including street lights and parking area lighting, shall be full cut-off fixtures and are encouraged to be eighty-five (85) degree full cut-off type fixtures. Parking area lights are encouraged to be greater in number, lower in height and lower in light level, as opposed to fewer in number, higher in height and higher in light level. Parking lot lighting shall not exceed IESNA recommended footcandle levels.

2.7 Pedestrian Walkways – Pedestrian walkways shall be designed for an average footcandle of 1.0. The minimum light on any pedestrian walkway shall not be less than 0.2 footcandles.

2.8 Building Entries- Building entries shall be designed for 3.0 footcandles.

2.9 Luminaire Mounting Height - Free standing luminaires shall be no higher than 25 feet above the stand/pole base. Luminaires used for playing fields shall be exempt from the height restriction provided all other provisions of this Ordinance are met and the light is used only while the field is in use. Building mounted luminaires shall be attached only to walls, and the top of the fixture shall not exceed the height of the parapet or roof, whichever is greater.

2.10 Uplighting - Uplighting is prohibited except in cases where the fixture is shielded from the sky by a roof overhang or similar structural shield. The fixture may not cause light to extend beyond the structural shield.

2.11 Flag Poles - Upward flagpole lighting is permitted for governmental flags only, and provided that the maximum lumen output is 1300 lumens. Flags are encouraged to be taken down at sunset to avoid the need for lighting.

2.12 Service Stations - The average footcandle lighting level for new service stations is required to be no greater than 30 footcandles, as set by the IESNA for urban service stations.

2.13 Canopy Lights - All lighting shall be recessed sufficiently so as to ensure that no light source is visible from or causes glare on public rights-of-way or adjacent property.

2.14 Landscape Lighting - Lighting of vegetation is discouraged and shall be in conformance with this Ordinance. Uplighting is prohibited.